

Appendix B: Industrial Sources of Mercury and Applicable Mercury-Specific Regulations

<i>Source</i>	<i># Fac. In Gl*</i>	<i>Origin/uses Of Mercury</i>	<i>Air Releases **</i>	<i>Water Discharges ***</i>	<i>Waste Management****</i>	<i>Comments</i>
MERCURY PRODUCTION						
Primary Hg Production		Hg no longer produced from Hg ore; primary Hg recovered as by-product from gold ores.	NESHAPS: Hg air emissions shall not exceed 2300 grams Hg/24hrs for mercury ore processing facilities (40CFR61.52)	Hg effluent limits for primary precious metals and Hg subcategory (40CFR 421.250) and mercury ore subcategory (40CFR440.40)	Solid wastes from extraction, beneficiation, and processing of ores exempt from RCRA hazardous waste regulations under Bevill amendment.	Mining facilities do not report chemical releases under TRI.
Secondary Hg Production	PA--2 IL--1 NY--1	Recycling/recovery of Hg containing products (e.g. dental amalgams, batteries); industrial waste and scrap (e.g. instrument and electrical manufacturing, waste, sludges from research labs).	Designated major source category of HAP emissions (CAA§112(c)).	Hg effluent limits for secondary Hg subcategory (40CFR421.200)-- NSPS, PSNS based on amount of Hg produced or processed.		In-house Hg reclamation also occurs at industrial plants. MN: drafting management standards for facilities recycling hazardous wastes. Hg refining plants in NY, PA, IL. MN also has three lamp recycling facilities.
Key: Hg - Mercury, CAA - Clean Air Act, NESHAPS - National Emissions Standards for Hazardous Air Pollutants, BIF - boilers and industrial furnaces, TRI - Toxic Release Inventory, MSW - municipal solid waste, HAP - hazardous air pollutant, MACT - maximum achievable control technology						
Note: This table shows the significant sources of Hg releases by source category, and how those releases are currently regulated. Appendix A includes five categories of mercury sources: (1) Mercury Production, (2) Use as a Manufacturing Input, (3) Waste Disposal, (4) Release as a By-Product of Manufacturing, (5) Release as a By-Product of Electrical Generation. An asterisk (*) indicates that additional information appears on the last page.						
Hg compound production	NY--3 OH--1 PA--1	Hg compounds include mercuric oxide, mercuric chloride, mercuric & mercurous sulfate, mercurous nitrate, organic Hg salt, thimersol				Many mercury compounds are imported.

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MERCURY USE IN MANUFACTURING*****						
Chemical And Allied Products						
Chlorine/Caustic Soda Manufacture (mercury cell chlor-alkali process)	WI--1 OH--1	Used as a catalyst in mercury cell process at chlor-alkali plants, which manufacture chlorine and sodium hydroxide. Hg cell process accounted for 14% of 1992 US chlorine production.	Hg emissions cannot exceed 2300g /24hrs; prescribed stack sampling methods required, and approved practices to meet specified ventilation emissions. (CAA (40CFR61, NESHAPS))	Existing Sources: BAT, BPT Hg effluent limits New Sources: NSPS, PSNS No pretreatment standards for existing sources using mercury cell process (40CFR415.60)	Industry Specific: K071 and K106 are chlor-alkali wastes listed specifically for Hg. Land disposal restrictions for chlor-alkali process wastes effective May 1993	Largest single use of Hg in US Impact of land disposal restrictions: some facilities are building mercury recovery plants; others are shipping wastes to Canada Many Hg cell plants have changed to diaphragm cell process
Laboratory Uses		Used in instruments as reagent, catalyst, indicator, and for calibration, sealing, and radioactive diagnosis		No restriction --POTWs may develop public education campaigns for labs		Use declined from 32 metric tons in 1990 to 10 metric tons in 1991.
Paint		Mercury compounds used to control microbial growth in latex paint cans; prevent mildew growth on painted surfaces; anti-fouling agent in maritime paint			P092 - Phenylmercuric acetate (Hg compound used in paints) is an acute RCRA waste	• All registrations for mercury biocides used in paint banned or voluntarily canceled by registrant • Hg in paints expected to continue declining as existing supplies depleted. Paint on buildings is demolition waste (not RCRA)
Other Chemical and Allied Products		(see Table 5 and Appendix B for mercury- containing products.)				
Chemical And Allied Products						
Pesticides		Mercury compounds used as pesticides, biocides, fungicides		Process wastewater from manufacture of metallo-organic pesticides w/active ingredient containing Hg prohibited, subject to variances approved by EPA (40CFR455.30)		Voluntary cancellation of last two mercury-containing fungicides announced in November 1993

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Electrical And Electronic Uses						
Electric Lamps		<p>Use: electrical conductor Hg emitted when lamps break</p> <p>Products: High intensity lamps: mercury vapor lamps (used in motion picture production, photography, heat therapy); metal halide lamps; high pressure sodium lamps; incandescent lamp filaments, fluorescent lights</p>		Waste streams from fluorescent bulb manufacturing exempted from pretreatment regulations (for all chemicals)	Hg levels in some products meet RCRA or state hazardous waste definition and require special management and disposal	<p>Second largest source of mercury in MSW</p> <p>Fluorescent bulbs are promoted for energy conservation, but considered hazardous waste due to Hg levels;</p> <p>In 1999, EPA included mercury-containing lamps the in universal waste rule.</p> <p>MN has three lamp recycling facilities.</p>
Wiring Devices & Switches		<p>Hg encased in metal is used as conductor to close electrical circuit</p> <p>Products: thermostats, Hg cells in smoke detectors, mercury arc rectifiers, silent switches, tilt switches, relays, cathode tubes used for radios, radar, & telecommunications equipment, electric toys</p>		No pretreatment limits for switchgear wastestreams (for any chemicals)		<p>Components found in a wide variety of equipment with electrical parts (e.g. white goods)</p> <p>These are considered hazardous wastes under RCRA.</p>
Battery Manufacturing		<p>(1) Used as anode or electrolyte to prevent corrosion and hydrogen release; extends shelf-life; improves performance in extreme temperatures. Products: alkaline batteries. (2) used as cathode in Hg oxide batteries.</p> <p>Products: mercuric oxide (Hg zinc) button batteries, silver oxide, zinc-air, carbon zinc batteries, mercuric oxide cannister batteries. Hg leaches from corrosion in landfill; volatilizes during combustion</p>		<p>Hg effluent limitations for LeClanche subcategory (zinc anode batteries w/acid electrolyte) (40CFR461.40); NSPS, PSNS, PSES based on mg/kg cell produced for specified operations only; no discharge allowed from nonspecified operations</p> <p>Hg effluent limits for zinc subcategory (40CFR461.70) - BPT,</p>		<p>Batteries are largest source of Hg in MSW incinerators.</p> <p>In 1996, Congress passed the Mercury-Containing and Rechargeable Battery Management Act which phases out the use of mercury in batteries sold in the U.S. The sole exception are button-cell batteries whose mercury content is limited.</p>

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				BAT, NSPS, PSES, PSNS specified for various processes		
Instruments And Related Products						
Measuring & Control Instruments		Use: Hg used to measure or control reactions and equipment functions; Products: thermometers (primary use), pressure sensing devices (barometers, manometers), navigational equipment, seals, valves; medical/ scientific instruments: Hg emissions occur during cleaning and refilling, and from instruments in municipal solid waste	None	None		Digital thermometers are replacing Hg thermometers. Hg thermometers banned in Sweden. MN has special management and disposal restrictions on thermostats.

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Dental Equipment & Supplies		Uses: forms alloys; chemically binds compounds together to form stable restorative material (amalgam is an alloy) Products: dental amalgam -- fillings for teeth, other dental equipment and supplies.	None	No specific pretreatment regulations --POTWs may develop education programs for dental offices		Dental amalgams may be a major source of elemental mercury vapor exposure to the general population. Dental amalgam in waste water contributes to POTW Hg levels; may contribute to mercury emissions in crematories.
NOTE: For product-specific information, please see Appendix B. Mercury has several thousand applications. Not all products and uses are specifically listed.						
PRODUCT DISPOSAL - INCINERATION AND LAND DISPOSAL						
Municipal Waste Incineration (under CAA, fuel feed stream must be >30% municipal waste)		Hg is present in solid waste (batteries, electric lighting, etc.) - Hg emitted when waste is burned at high temperatures.	EPA has established MACT standards for major stationary sources. Rule compliance date is 12/2000. MN - proposed waste combustion rules including emissions limits; new incinerator permits with Hg limits will require air monitoring systems and periodic stack testing.	N/A	MSW ash is considered hazardous waste if it exceeds RCRA toxicity levels. Supreme Court decision (<i>Chicago v. EDF</i> , March 1994)	Municipal solid waste includes waste generated from residential, commercial, and institutional sources; equipment installed to trap fly ash and acid rain gases do not control Hg emissions MN: Hg must be removed from products before disposal. OH: Considering installing Hg emission control equipment and separating Hg containing products; IL: Incinerator technology based on consideration of specific pollutants.
Commercial/Industrial Waste Incinerators		Hg present in wastes: batteries, lighting, etc.	EPA will issue proposed rules by 12/2000, and final rules by 12/2001 in accordance with CAA§129(a)(4).	N/A		

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Sewage Sludge Driers & Incinerators	NY--33 PA--21 MI--19	Hg in sludge from wastewater treatment plants.	CAA - Hg emissions limit = 3200g/24hrs; annual monitoring and reporting if Hg emissions exceed 1600 g/24hrs; prescribed emissions testing procedure or procedures for sludge to demonstrate compliance (40CFR61.52, NESHAPS); Listed as source category for HAP emissions limits (CAA §112(c)(1))	(see wastewater treatment)		EPA is considering a revised rule.
Wastewater Treatment		Hg present in wastewater entering facility	No existing standards; not listed as category of HAP sources.	Mercury is eligible for removal credits - POTWs may request removal credits against facility pretreatment limits, as long as POTW meets sludge concentration limits	Sludges for land application or surface disposal must meet specific concentration requirements for agricultural land, forest land, public contact sites, home garden application or landfills Hg concentration limits in sludge: 57 mg/kg limit for land application of sludge (40CFR503)	EPA will conduct studies to characterize HAP emissions from industries discharging to POTWs Hazardous waste incinerators may test Hg content in sludge in lieu of emissions testing requirements. Western Lake Superior Sanitary District (WLSSD) in Duluth, MN has active pollution prevention program MI - POTWs must have waste minimization plans

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Hazardous Waste Incinerators	IL--1		<p>No uniform emissions standards; Hg limits depend on individual permits; facilities shielded from regulatory changes until permit expires (CFR 264.344)</p> <p>Waste analysis required to determine Hg concentrations unless incinerator has documentation of no Hg presence (40CFR265.341)</p> <p>Rule expected in 1999.</p>		Residues must meet LDR specifications	<p>EPA is revising draft hazardous waste combustion rules based on MACT standards</p> <p>Cement kilns also burn hazardous waste</p>
Medical Waste Incinerators		Hg in wastes generated from hospitals, clinics, labs, etc.	<p>In 1997, EPA set mercury emissions limits based on MACT standards for new and existing facilities. Rule Comply date is 9/2002..</p> <p>WI - incinerators with capacity >5 tons/day must be tested for Hg during first 90 day period and following year</p>			

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Landfills		Mercury in products in the municipal waste stream, especially those subject to breakage such as thermostats, thermometers, and fluorescent lamps.	Under CAA (§112(d)) EPA will issue mercury emission standards for municipal solid waste landfills by 11/2000. Regulations will be based on MACT standards.	Monitor for Hg in groundwater; leachate testing requirements	<p>Subtitle D (non-hazardous) landfills: leachate cannot exceed 0.2mg/l Hg;</p> <p>Subtitle C (hazardous waste) landfills: disposal prohibited unless waste undergoes prescribed treatment to reduce Hg to regulated levels</p> <p>Determine Hg concentrations if food chain crops are grown - Hg cannot be transferred to food chain portion of crop</p>	<p>MN - studying Hg content of landfill gas and leachate. IL - Hg components must be removed from discarded white goods (e.g. appliances) before disposal</p> <p>MN: Hg must be removed from products before disposal.</p>
Ash disposal facilities		Mercury in incinerator ash	permit specific			
Auto salvage/ scrap yards		Automobile components have Hg, some automobiles used for illegal disposal; Hg released from crushing switches			MN monitors mercury levels	MN: developing best management practices for yard operators
Crematories		Hg in dental fillings volatilizes during cremation	Crematorium and pathological unit rules will be proposed 11/1999, as required by CAA §129.			
Hospitals, Dentists		Mercury in waste streams (water and solid waste)		No pretreatment regs		<p>IL: P² Bureau gives guidance on Hg disposal</p> <p>MN: WLSSD has a brochure for dentists</p> <p>OH: Community volunteer efforts address Hg in waste</p>

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MERCURY AS A BY-PRODUCT OF MANUFACTURING PROCESSES						
Carbon Black Production	MI--1 OH--1	Hg present in oil feedstock		No Hg limits; but discharge of process waste water prohibited except to POTWs. 40CFR458		
Coke Production	IL--3 IN--3 MI--1 NY--1 OH--3, PA--3	Hg is By-product present in coal used as feedstock for coke oven batteries (primary feedstock for iron and coal industry)				
Petroleum Refining		Hg present in petroleum crude		No specific Hg limits.		
Lime Manufacturing	IL--1 OH--1 PA--1	Hg present as impurity in processed stone and from fuel used to heat kilns				
Portland Cement Manufacturing		Hg present in ore and minerals used as raw materials; Hg in fossil fuels used in cement kilns	EPA issues proposed rules in 3/98. Feed rate screening limits for mercury specified under interim standards for burners or industrial furnaces (40CFR266.103 and 266.106)			Cement kiln dust exempt from RCRA hazardous waste definition. Cement industry is increasing its use of municipal, industrial, and hazardous wastes for kiln firing to replace fossil fuel use (for energy conservation); EPA is revising draft hazardous waste combustion rules
Phosphate-based fertilizer factories		Hg is trace element in rock phosphate				
Primary Smelting & Refining of Copper	MI--1	Copper recovered from sulfide ore that contains Hg		Hg effluent limits for copper, lead, zinc, gold, silver ores subcategory (40 CFR 440.100)		Residues exempted from RCRA under Bevill exclusion

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Primary Smelting & Refining of Nonferrous Metals, Except Copper & Aluminum		Hg present in almost all minerals; lead recovered from sulfide ore that contains Hg; zinc smelting process generates Hg emissions	No existing regulations for mercury Many mining facilities are listed as source categories for HAPS	Hg effluent limitations for: primary antimony subcategory (nonferrous metals category). (40CFR421.140); copper, lead, zinc, gold, silver, and molybdenum ores (40CFR440.100), and platinum ores subcategory (440.110)		Residues exempted from RCRA under Bevill exclusion
MERCURY RELEASED AS A BY-PRODUCT IN POWER GENERATION AND HEATING						
Electric Power Generation (Utility Boilers)		Hg present in coal, oil, natural gas, or wood used in electric utility steam generating units - emitted as trace contaminant when volatilized at high temperatures.	No current Hg emissions limits under CAA. CAA 112(n)(1)(A) Utility Study Report to Congress (1998) analyzed the public health hazards from utilities; EPA may promulgate regulations based on study results; utilities exempted from list of sources accounting for 90% of Hg emissions that will require MACT standards (§112(c)(6))	No detectable Hg allowed in discharge	Residues exempt from RCRA under Bevill exclusion	Coal has highest Hg content of fossil fuels. 80% of energy consumption in utility boilers is from coal combustion; 95% of coal is bituminous and subbituminous coal.
Commercial & Industrial Boilers		Hg present in fuels	EPA will issue proposed rules 12/2000, and final rules 12/2001.			
Residential Boilers and Wood Stoves		Hg present in fuels				

Notes:

Source categories used to identify manufacturing uses of mercury follow Bureau of Mines categories, which track U.S. industrial consumption of refined Hg metal.

Mercury releases to air, water and land are reported by manufacturing firms that meet TRI threshold requirements. Manufacturing facilities (SIC codes 20-39) that have 10 or more full time employees and manufacture/process 25,000 pounds of a listed chemical or otherwise use 10,000 pounds of a listed chemical must report chemical release information in TRI.

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<p>* "# FAC. IN GL" = number of facilities in Great Lakes States. Source: National Emissions Inventory of Mercury and Mercury Compounds: Interim Final Report, USEPA, 12/93.</p>						
<p>** Air emissions: EPA must list source categories that account for 90% of aggregate Hg emissions by 1995, excluding electric utilities. Sources will be subject to MACT standards within 10 years (§112(c)(6)). EPA has also published a list of major categories and subcategories of sources that emit hazardous air pollutants (including mercury and compounds). Any stationary source emitting more than 10 tons per year of a listed substance or 25 tons per year of any combination of substances will be subject to MACT standards. Major air toxics emitters will require permits.</p>						
<p>*** Water discharge: BAT=best available control technology, BPT=best practicable control technology, NSPS=new source performance standards, PSNS=pretreatment standards for new sources, PSES=pretreatment standards for existing sources. States may impose more stringent permit limits to meet water quality standards for mercury (standards vary by state). Facilities must notify POTW of hazardous substances discharged which are not covered by pretreatment standards.</p>						
<p>**** Waste management: Mercury is a listed and characteristic waste under RCRA. Any source listed here may be generating D009, the RCRA hazardous waste code that identifies wastes characteristic for mercury. Other RCRA waste codes that identify mercury include U151 (mercury), K071 and K106 (listed for mercury), F039 (listed for multiple sources), P065 and P092 (mercury compounds). All mercury-containing wastes have land disposal restrictions. Specified treatment for mercury-containing wastes is incineration or thermal processing (40CFR 268.42).</p>						

Appendix C: Regulations on Products that Contain Mercury

Note: This table highlights regulations that affect the most common mercury-containing products. It is not a comprehensive list of all products that may contain mercury. The "Comments" section includes general information that expands on the regulatory information.

<i>Product/Use</i>	<i>Role of Mercury</i>	<i>Regulations/Programs on Mercury Products</i>	<i>Fed/State Regulation</i>	<i>Comments</i>
Chemical and Allied Products				
Agricultural Products	Mercury compounds used as pesticides, bactericides, disinfectants, fungicide	Restricted and/or banned under FIFRA	Federal	
Turf Products	Pesticide	Calo-chlor and calo-gran, the last mercury-based pesticides registered for use in U.S. voluntarily canceled by manufacturer (Grace Sierra Crop Protection) in November 1993	Federal	Approximately 21,000 pounds used annually on golf course turf and greens to control fungi Pink Snow Mold and Grey Snow Mold; manufacturer may sell and distribute products labeled for release or shipment before 6/93 until 6/94; retailers may sell products until stocks exhausted; users may use products until stocks depleted.
	Fungicide	Prohibits use of mercury in fungicides	MN	
Paint	Mercury compounds used as biocide to control microbial growth in paint cans and prevent mildew on painted surfaces	Registrations for mercury compounds in indoor and outdoor latex paint banned or canceled (1990, 1991)	Federal	Manufacturers may use up existing stocks Cancellation of biocide registrations has reduced Hg consumption in paint, and paint residue in municipal solid waste; paint cans w/mercury residue are still discarded
		Anti-fouling paints for marine use banned in 1972	Federal	
		No Hg deliberately introduced into paint intended for use in MN (except in art supplies)	MN	
Pigment, Dyes	Coloring (maroon, red, orange) primarily for plastics	Cadmium-mercury pigments no longer manufactured in U.S. (domestic production ceased in 1988); may still be imported	Federal	Many states have laws that phase out metals in pigments
		No Hg deliberately introduced into pigments and dyes intended for use in MN (except in art supplies)	MN	
Cosmetics	Preservative, antimicrobial	Limited to eye area cosmetics or ointments with concentration <65 ppm (21CFR700.13)	Federal	
Pharmaceuticals	Used in antiseptics, ointments, diuretics	Misbranded drug laws - list quantity of mercury in product	IL, IN, NY, OH, PA	

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Product/Use	Role of Mercury	Regulations/Programs on Mercury Products	Fed/State Regulation	Comments
		Yellow mercuric oxide is not generally recognized as safe and effective, or is misbranded for over the counter use	Federal	
Poisons		Restrictions on sale of mercury and mercury compounds	OH	
		Levels established for Hg products to be considered poisons	PA	
Catalysts	Hg used as catalysts for production of vinyl chloride monomers and urethane foams, as well as other products			
Packaging		Restrictions on merc contains intentionally introduced Hg content in packaging and packaging components; no products may be sold in packaging that contains intentionally introduced mercury.	FL, IL, MN, NJ, NY, WI	Implementation dates vary by state, and include general exceptions if no feasible alternatives exist; Pennsylvania is considering bill to regulate toxic materials in packaging
Special Paper Coatings	Mercury bromide and mercury acetic acid used in specialized paper and film with cathode ray tubes			Manufacturers plan to phase out use of mercury in coating
Explosives	Mercury fulminate is detonator	Explosives containing mercury are Class A, maximum hazards	MN, WI	In the last 20 years, only the military has used mercury explosives
Fireworks	Catalyst/explosive	Permits required for fireworks with mercury Fireworks containing mercury are prohibited.	MN MI, NJ	
Livestock and Poultry Remedies		List percentage of mercury on remedy	MI	
Electrical and Electronic Uses				
Electric Lighting				Electric lighting products are second largest component of municipal solid waste (after batteries)
Fluorescent Lamps (low pressure)	Mercury vapor fluoresces at UV wavelength	Encouraged as replacement for incandescent bulbs for energy conservation (see 10CFR450.31 - energy conservation measures). Included in the Universal Waste Rule.	Federal	Fluorescent lights are largest component of electric lighting discards in municipal solid waste; used bulbs considered hazardous waste because high levels of mercury exceed RCRA toxicity

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		Lamps in state-owned buildings must be recycled.	MN	characteristic limit (.2 mg/l in leachate)
		Viewed as by-product that can be recycled, and exempt from RCRA	OH	
		Lamps sold to managers of industrial, commercial, office, or multi-unit buildings must be labeled; building contractors must specify mercury management plans for removed lamps	MN	
		Lamps containing mercury must be labeled.	VT	
Mercury Vapor Lamps	Facilitates light production by electric arc	Encouraged for energy conservation (see 10CFR450.31 - energy conservation measures)	Federal	
		Included in the Universal Waste Rule.		
		Lamps must be self-extinguishing or have protective shield; efficiency standards in public areas (theaters, gyms)	NY	
		Mercury must be removed before disposal; lamp sellers and contractors responsible for public education about mercury management requirements; limits on production and distribution of lamps	MN	
		Lamps containing mercury must be labeled.	VT	
High Intensity Lamps		Included in the Universal Waste Rule.	Federal	
		Lamps sold to managers of industrial, commercial, offices, or multi-unit buildings must be labeled; building contractors must specify mercury management plans for removed lamps	MN	Used for outdoor lighting; mercury lamps are more efficient and brighter than other outdoor lights
		Lamps containing mercury must be labeled.	VT	
Metal Halide Lamps		Included in the Universal Waste Rule.	Federal	Encouraged for energy conservation (see 10CFR450.31-energy conservation measures)
		Lamps containing mercury must be labeled.	VT	
Incandescent Lamp Filaments	Hg used as continuous electrical contact in tungsten bar sintering	Included in the Universal Waste Rule.	Federal	
		Lamps containing mercury must be labeled.	VT	
<i>Wiring Devices and Switches</i>				
Thermostats	Temperature measurement	Mercury must be removed for recycling or recovery before disposal; manufacturers must provide information and incentives to ensure recycling or proper management; heating, ventilating and air-	MN	Digital thermostats are replacing mercury thermostats; long lag time before old Hg thermostats discarded

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Product/Use	Role of Mercury	Regulations/Programs on Mercury Products	Fed/State Regulation	Comments
		conditioning (HVAC) dealers required to properly manage or recycle used mercury thermostats (MN St 115A.93, 115A.9561, 115.932) Products containing Hg must be labeled, including disposal restrictions	MN	MN has pilot program for HVAC dealers to recycle mercury containing thermostats by returning them to HVAC wholesaler who, in turn, returns them to Honeywell for recycling/reclaiming
White Goods	Mercury components (e.g., switches) may be included in large appliances (e.g., refrigerators, air conditioners, etc.)	Mercury components must be removed prior to disposal Hg in repaired or replaced items must be reused or recycled	MN, IL MN	
Toys		Ban on toys with Hg; fines imposed for retail sales	MN, WI	
Electric Wall Switches		Products containing Hg must be labeled, including disposal restrictions	MN	
Electrical Components	May be included in any electrical machinery (e.g., mining, automotive, and industrial equipment, smoke detectors, etc.)	Limits on mercury use in mining equipment Products containing mercury must be labeled, including disposal restrictions	PA MN	
Batteries				
General Mercury Containing Batteries		Batteries included in universal waste rule to ease RCRA restrictions on hazardous waste management and divert waste from MSW landfills; states may set up special collection programs not subject to storage, transportation, and permitting requirements of RCRA 1996 Battery Management Act bans all mercury-containing batteries in the U.S., except for button-cells batteries.	Federal	Batteries were largest source of Hg in municipal solid waste. Many states have banned mercury in batteries; manufacturers have reduced mercury use by over 90% since 1988. EPA is requesting comments on labeling batteries to aid in collection, sorting, and recycling; denied a petition filed under STSCA to require deposit on mercury-containing batteries.
		Deposit/refund system will begin in 1998: purchasers return used mercury batteries to retailer or approved collection facility	MI	
		Task force on storage, transport, disposal,	IL	Industry groups have developed uniform voluntary

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		recycling		industry labeling standards for lead and cadmium batteries
Alkaline Batteries	Prevents corrosion and hydrogen release, extends shelf life; improves performance over temperature range (batteries used in flashlights, radios, and other electronics)	Hg concentrations <.025% by weight	MN, NY	Battery manufacturers have eliminated mercury in alkaline batteries, except button cells and reusable batteries.
		Hg banned in alkaline batteries in 1996	MN, WI MN	
Mercuric Oxide Batteries (also button cell, mercury-zinc button cell)	Mercury used as cathode material and is integral component (button cell batteries contain ~40% mercury)	Sale of dry cell batteries with mercuric oxide, electrode batteries prohibited without exemption; button cell nonrechargeable batteries restricted to <25mg Hg; labeling requirements; disposal prohibited; manufacturers responsible for collection system	MN	Primarily used in hearing aids; also used in calculators, watches, cameras, photographic equipment, electronic games, health/hospital equipment, airplane underwater locator beacons
		Hg content of alkaline button cell batteries must be <25 mg by weight	NY	NY is exploring recycling options for these batteries Some mercuric oxide cells used in military and medical operations (e.g., night vision devices, EKG machines, etc.) are disposed of as hazardous waste. Proposed federal legislation may ban mercuric oxide batteries.
Carbon Zinc (LeClanche)	Contain ~1% Hg; Hg controls chemical reactions between zinc and other battery components	Sale prohibited if Hg concentration >1ppm	NY	Carbon zinc cells have shorter life than alkaline batteries. Mercury is no longer used in certain zinc battery products.
		Sale of batteries with Hg banned after 1994	WI	
Zinc Air	Hg content ~ 1%	Button cells restricted to <25 mg mercury, labeling	MN	Used in pagers, hearing aids

Appendix C: Regulations on Products that Contain Mercury

Note: This table highlights regulations that affect the most common mercury-containing products. It is not a comprehensive list of all products that may contain mercury. The "Comments" section includes general information that expands on the regulatory information.

Product/Use	Role of Mercury	Regulations/Programs on Mercury Products	Fed/State Regulation	Comments
Instruments and Related Products				
Measure and Control Instruments				
Thermometers	Elemental mercury indicates temperature	Limits on distribution of Hg thermometers; mercury must be removed before disposal; no routine distribution of Hg thermometers by medical facilities	MN	Digital thermometers are replacing mercury thermometers
Barometers	Indicates pressure			
Medical, Scientific Instruments	Temperature and pressure measuring devices	Products w/Hg must be labeled, including disposal restrictions	MN	
Dental Equipment and Supplies				
Dental Equipment/Supplies	Forms alloys; chemically binds compounds to form restorative material	FDA regulates dental mercury and amalgam alloys separately as class I and class II devices under Federal Food, Drug, and Cosmetic Act	Federal	One of nation's largest manufacturers of mercury amalgam dental fillings will place warnings on amalgam containers shipped to California and provide warning signs for dental patient waiting rooms under California's Proposition 65 (Safe Drinking Water and Toxic Enforcement Act).
		Disposal banned unless mercury reused, recycled or managed to ensure compliance	MN	
		Purchaser must sign agreement of use for medical or dental uses	MN	The Act requires businesses that use or distribute toxics to label or otherwise notify the public about possible exposure to chemicals.
Discontinued Uses				
embalming fluid	Preservative			
film pack batteries		Use discontinued as of 1988		
maritime paints	Antifouling agent	Registrations suspended in 1972	Federal	
photographic development				
soap				
wood preservatives				

Appendix D: Examples of State Mercury Controls

Adapted from the Mercury Study Report to Congress Volume VIII, 1997

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
ENVIRONMENTAL SOURCES		
General	Minnesota	<ul style="list-style-type: none"> State has established goals of reducing total mercury releases, from new and existing sources, into air and water by 60 percent from 1990 levels by 12/31/2000, and by 70 percent from 1990 levels by 12/31/2005.
	Vermont	<ul style="list-style-type: none"> State has established an advisory committee on mercury pollution.
Air Point Sources	Florida	<ul style="list-style-type: none"> Mercury emission standard for municipal solid waste incinerators (65 micrograms/m³).
	Minnesota	<ul style="list-style-type: none"> Proposed waste combustion rules include emission limits. New incinerator permits with mercury limits will require air monitoring systems and periodic stack testing.
	New Jersey	<ul style="list-style-type: none"> Mercury emission standard for municipal solid waste incinerators (65 micrograms/m³), with further reductions to be phased in.
	Ohio	<ul style="list-style-type: none"> Considering installing mercury-emission control equipment.
	Wisconsin	<ul style="list-style-type: none"> State will prepare and adopt minimum standards for mercury air emissions. Medical waste incinerators with capacity greater than 5 tons per day must be tested for mercury during the first 90 day period of operation and once the following year.
Water Point Sources	Michigan	<ul style="list-style-type: none"> Businesses must report use and discharge information for mercury under the Water Pollution Control Act.
	Wisconsin	<ul style="list-style-type: none"> State will adopt maximum discharge limits on mercury and mercury compounds.
Hg-Containing Wastes	Florida	<ul style="list-style-type: none"> It is illegal for small quantity generators (SQGs) to knowingly place batteries or products containing a mercuric oxide electrode into their solid waste stream. Also, manufacturers and distributors of mercuric oxide batteries are required to implement a take-back program for these batteries and products with non-removable batteries, without regard to brand. The incineration of, or landfill disposal of mercury-containing devices and spent lamps is prohibited. Requires local governments to implement source separation programs at solid waste facilities to remove mercury containing devices.
	Minnesota	<ul style="list-style-type: none"> Management standards for facilities recycling mercury- containing hazardous wastes (currently being drafted). Mercury must be removed from products before disposal.
	New Hampshire	<ul style="list-style-type: none"> Established a committee to study mercury source reduction and recycling issues.
	Vermont	<ul style="list-style-type: none"> Labeled mercury-added consumer products must be separated and disposed of in authorized facilities. All solid waste districts and municipalities must implement public information and mercury-collection programs. State prohibits landfill disposal of labeled mercury-added consumer products.
	Wisconsin	<ul style="list-style-type: none"> State requires testing and reporting of mercury emissions by operators of Medical Waste Incinerators.
PRODUCTS		
White Goods	Illinois	<ul style="list-style-type: none"> Mercury components must be removed from discarded white goods before disposal.
	Minnesota	<ul style="list-style-type: none"> Products containing mercury must be labeled, and the labels must include any disposal restrictions. Mercury components must be removed prior to disposal. The distribution of mercury- containing fever thermometers is restricted. Manufacturers must provide information and incentives regarding recycling or proper management. HVAC dealers are required to properly manage or recycle used mercury thermostats. Mercury in repaired or replaced items must be recycled.
Batteries	Arkansas	<ul style="list-style-type: none"> Ban on the manufacture of alkaline batteries containing any mercury effective 1- 1- 96. Ban on the manufacture of mercury- containing zinc carbon and mercury button cell batteries effective 1- 1-

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<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
		<ul style="list-style-type: none"> 94. State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 94.
	California	<ul style="list-style-type: none"> Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 94, and ban on the manufacture of alkaline batteries containing any mercury effective 1- 1-96. Ban on the manufacture of mercury- containing zinc carbon and mercury button cell batteries effective 1- 1- 94.
	Connecticut	<ul style="list-style-type: none"> Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92. Ban on the manufacture of mercury- containing zinc carbon batteries effective 1- 1- 93. Collection of mercury button cell batteries required by retailer effective 1- 1- 92. State issued regulations defining responsibilities of manufacturer, supplier and user effective 1- 1- 92.
	Florida	<ul style="list-style-type: none"> Ban on the sale of alkaline batteries containing mercury greater than 0.025% by weight effective 7- 1- 95, and ban on the retail sale of alkaline and zinc carbon batteries containing any mercury effective 1- 1- 96. Ban on the sale of mercury button cell batteries effective 10- 1- 93. State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 94. Ban on the sale of mercury containing batteries if manufacturer fails to meet collection procedures and other responsibilities effective 1- 1- 94.
	Illinois	<ul style="list-style-type: none"> Task force to study storage, transport, disposal and recycling.
	Iowa	<ul style="list-style-type: none"> Ban on the sale of alkaline batteries containing mercury greater than 0.025% by weight effective 7- 1- 93, and ban on the retail sale of alkaline batteries containing any mercury effective 1- 1- 96. State issued regulations defining responsibilities of manufacturer, supplier and user effective 7- 1- 96. Ban on the sale of mercury- containing batteries (including button cells) if manufacturer fails to meet collection procedures and other responsibilities effective 7- 1- 96. Collection of mercury button cell batteries required by retailer effective 7- 1- 96.
	Maine	<ul style="list-style-type: none"> Ban on the sale of alkaline batteries containing mercury greater than 0.025% by weight effective 1- 1- 94, and ban on the manufacture of alkaline batteries containing any mercury effective 1- 1- 96. Ban on the sale of mercury containing zinc carbon batteries and mercury button cell batteries effective 1- 1- 93. State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 94.
	Maryland	<ul style="list-style-type: none"> Collection of mercury button cell batteries required by retailer effective 7- 1- 94. Ban on the sale of mercury button cell batteries if manufacturer fails to meet collection, transportation, disposal and consumer education responsibilities effective 7- 1- 94. General ban on the sale of mercury containing batteries effective 7- 1- 94, but state authorized to grant exemptions if certain requirements are met. State issued regulations defining responsibilities of manufacturer, supplier and user effective 7- 1- 94.
	Massachusetts	<ul style="list-style-type: none"> Ban on the retail sale of mercury- containing alkaline batteries effective 1- 1- 95 is pending. State regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries are pending.

Appendix D: Examples of State Mercury Controls

Adapted from the Mercury Study Report to Congress Volume VIII, 1997

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
		<ul style="list-style-type: none"> Ban on the sale of mercury button cell batteries is pending.
	Michigan	<ul style="list-style-type: none"> A new battery law signed on June 29, 1995. This law bans the sale of alkaline batteries containing mercury (with the exception of alkaline manganese button cells containing less than 25 mg of mercury) and zinc carbon batteries containing mercury beginning January 1, 1996. The sale of mercuric oxide batteries (with the exception of button cells) are also banned for sale after January 1, 1996, unless the manufacturer identifies a collection site for recycling, informs users of the locations and informs the purchasers of a telephone number that can be called to get information about returning mercuric oxide batteries for recycling or proper disposal.
	Minnesota	<ul style="list-style-type: none"> Required manufacturer to sell alkaline batteries containing no more than 0.025% mercury by weight effective 2- 1- 92, and has banned manufacturer sale of alkaline batteries containing any mercury effective 1- 1- 96. General ban on the sale of mercury- containing batteries effective 2- 1- 92, but state authorized to grant exemptions if certain requirements are met. Mercury batteries may not contain more than 25 mg of mercury unless an exemption is granted. Sale of dry cell batteries with mercuric oxide and electrode batteries prohibited without exemption. Ban on mercury button cell batteries effective 2- 1- 92. Manufacturers must set up collection, transport, recycling and consumer education programs.
	New Hampshire	<ul style="list-style-type: none"> Required manufacturer to reduce the level of mercury in alkaline batteries to 0.025% by weight effective 1- 1- 93, and has banned the manufacturer sale of alkaline batteries containing any mercury effective 1- 1- 96. Ban on the manufacture of mercury- containing zinc carbon batteries effective 1- 1- 93. State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 93. State issued regulations regarding the collection of mercury button cell batteries effective 1- 1- 93.
	New Jersey	<ul style="list-style-type: none"> Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92, and ban on the manufacture of alkaline batteries containing any mercury effective 1- 1- 96. Ban on the manufacture of mercury- containing zinc carbon batteries effective 1- 1- 92. Ban on mercury button cell batteries effective 1- 1- 94. State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 20- 93. Sale of mercury batteries banned if manufacturer fails to meet collection and other responsibilities effective 1- 20- 93.
	New York	<ul style="list-style-type: none"> Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92. Ban on the manufacture of mercury- containing zinc carbon batteries effective 1- 1- 93. Mercury oxide battery ban pending.
	Oregon	<ul style="list-style-type: none"> Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92.
	Rhode Island	<ul style="list-style-type: none"> Required manufacturer to reduce the level of mercury to 0.025% by weight in alkaline batteries effective 1- 1- 92. State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 94.

Appendix D: Examples of State Mercury Controls

Adapted from the Mercury Study Report to Congress Volume VIII, 1997

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
		<ul style="list-style-type: none"> Ban on mercury button cell batteries effective 1- 1- 93.
	Vermont	<ul style="list-style-type: none"> Required manufacturer to reduce the level of mercury in alkaline batteries by 0.025% by weight effective 2- 1- 92, and ban on the retail sale of alkaline batteries containing any mercury effective 1- 1- 96. Ban on mercury button cell batteries effective 1- 1- 93. State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 1- 1- 93. Batteries sold to the public containing mercury must be labeled, other than button batteries.
	Wisconsin	<ul style="list-style-type: none"> Ban on the manufacture of mercury- containing alkaline batteries effective 1- 1- 96, and ban on the manufacture of mercury- containing zinc carbon batteries effective 7- 1- 94. State issued regulations defining collection procedures and responsibilities of the manufacturer and user of mercury batteries effective 7- 1- 94. Ban on the manufacture of mercury- containing batteries if manufacturer fails to meet collection procedures and other responsibilities effective 7- 1- 94.
Electrical Components	Minnesota	<ul style="list-style-type: none"> Switches, electric relays, or other electrical devices individually or as part of another product, that contain mercury, must be labeled, and the labels must include any disposal restrictions.
	Pennsylvania	<ul style="list-style-type: none"> Mercury use in mining equipment (i.e., electrical machinery) is limited.
	Vermont	<ul style="list-style-type: none"> Requires labeling of switches, electric relays, or other electrical devices individually or as part of another product, that contain mercury.
Paints and Pigments	Minnesota	<ul style="list-style-type: none"> No mercury can be deliberately introduced into products intended for use in Minnesota, except for art supplies.
Medical and Dental Uses	Minnesota	<ul style="list-style-type: none"> Disposal of dental equipment and supplies containing mercury is banned, unless the mercury is reused, recycled, or managed to ensure compliance. Purchaser must sign an agreement of use for medical or dental uses. Ban on the use of mercury manometers.
	New Jersey New Hampshire	<ul style="list-style-type: none"> Prohibits sale or use of embalming fluids containing mercury.
	Vermont	<ul style="list-style-type: none"> Products containing mercury must be labeled.
Toys	Michigan	<ul style="list-style-type: none"> No sale of toys containing mercury (pending).
	Minnesota Wisconsin	<ul style="list-style-type: none"> Toys with mercury are banned and fines are imposed on retail sales of toys containing mercury.
Laboratory Uses	Michigan	<ul style="list-style-type: none"> Mercury will be banned in school labs by the year 2000.
Lighting	Florida	<ul style="list-style-type: none"> Ban on incineration of lamps. Crushing, landfilling and recycling of lamps allowed with appropriate controls (proposed). Florida also will control management of residual mercury from recycling operations.
	Minnesota	<ul style="list-style-type: none"> Fluorescent lamps and high intensity lamps sold to managers of industrial, commercial, office, or multi-unit buildings must be labeled and building contractors must specify mercury management plans for removed lamps. Lamps in state- owned buildings must be recycled. Mercury must be removed from mercury vapor lights before disposal and lamp sellers and contractors must provide public education about mercury management requirements. The production and distribution of mercury vapor lights are limited.

Appendix D: Examples of State Mercury Controls

Adapted from the Mercury Study Report to Congress Volume VIII, 1997

<i>Mercury Sources/targets</i>	<i>States with Controls</i>	<i>Control/action</i>
	New York	• Mercury vapor lights must be self- extinguishing or have protective shield.
	Ohio	• Lamps are viewed as by- products that can be recycled, and exempt from RCRA.
	Vermont	• Lamps containing mercury must be labeled.
Poisons	Ohio	• The sale of mercury and mercury compounds is restricted.
	Pennsylvania	• Levels established for mercury products considered to be safe.
Packaging	Florida New Jersey	• State bans the sale of, and restricts the use of packaging and packaging components containing mercury.
	Illinois Minnesota New York Wisconsin	• Restrictions on mercury content in packaging are being phased in. (Dates and concentrations vary by state).
Pharmaceuticals	Michigan	• Labeling of livestock remedies containing mercury is required.
	Illinois Indiana New York Ohio Pennsylvania	• Manufacturers must list the quantity of mercury in products.
Explosives/Fireworks	Michigan New Jersey	• The sale or use of fireworks containing mercury is prohibited.
	Minnesota Wisconsin	• Explosives containing mercury are Class A maximum hazards. • Permits required for fireworks with mercury (Minnesota only).
Thermostats and Thermometers	Minnesota	• Manufacturers of thermostats containing mercury must label such items and provide incentives for, and information to, purchasers and consumers to ensure the mercury disposal is properly managed. Otherwise, the manufacturer is liable for improper disposal of such thermostats by purchasers and consumers. • Medical facilities may not routinely distribute thermometers containing mercury.
	Vermont	• Products containing mercury must be labeled.
Automobiles	Minnesota	• Crushing of automobiles is prohibited unless a good faith effort has been made to remove all mercury switches.

Appendix E: Federal Mercury Controls

Adapted from OECD, 1995

<i>Specific Sources/focus</i>	<i>Control/action</i>
ENVIRONMENTAL MEDIA	
Drinking Water	<ul style="list-style-type: none"> Maximum contaminant level (MCL) = 0.002 mg/ L (40 CFR 141.62, 21 CFR 103.35).
Surface Water	<ul style="list-style-type: none"> Ambient Water Quality Criteria: water and organisms = 0.012 µg/ L (40 CFR 401, 403, Appendix B). Water Quality Guidance for the Great Lakes System: aquatic life = 1.44 µg/ L (acute) and 0.77 µg/ L (chronic); human health = 0.0018 µg/ L; wildlife = 0.0013 µg/ L (40 CFR 132).
Air	<ul style="list-style-type: none"> No ambient air standard.
Soil	<ul style="list-style-type: none"> No soil standard.
ENVIRONMENTAL SOURCES	
Air Point Sources	<ul style="list-style-type: none"> Emissions from mercury ore processing facilities and mercury cell chlor- alkali plants are limited to a maximum of 2,300 g/ 24 hours (40 CFR 61.01). Emissions from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges are limited to a maximum of 3,200 g/ 24 hours (40 CFR 61.52). Industrial sources emitting mercury and mercury compounds may be subject to Maximum Achievable Control Technology (MACT) standards for major stationary sources and Generally Available Control Technology (GACT) standards for area sources^{1b}. Emission guidelines on mercury emissions from municipal waste combustors under §§ 111 and 129 of the 1990 Clean Air Act Amendments. Regulations on mercury emissions from medical waste incinerators under §§ 111 and 129 of the 1990 Clean Air Act Amendments were promulgated on August 15, 1997. Airborne emissions of mercury on and other substances from the burning of hazardous waste in boilers and industrial furnaces, including cement kilns, are regulated under the Resource Conservation and Recovery Act (40 CFR 266).
Water Point Sources	<ul style="list-style-type: none"> Effluents from industrial facilities and municipal wastewater treatment facilities are regulated through industry- specific pretreatment standards and effluent guidelines for existing and new sources of pollution and are based on the limits of the available control technology (40 CFR 401, 403, Appendix B). Groundwater at hazardous waste treatment, storage and disposal facilities must be monitored for the presence of mercury (40 CFR 302.4, 264.94).
Sewage Sludge	<ul style="list-style-type: none"> Permissible levels of mercury in municipal wastewater treatment sludges: 17 mg/ kg dry wt. and cumulative load of 17 kg/ hectare for agricultural land; 17 mg/ kg dry wt. and annual load of 0.85 kg/ hectare for home garden or lawn; 57 mg/ kg dry wt. for other land applications; and 100 kg/ hectare for surface disposal (CWA).
Mercury-Containing Wastes	<ul style="list-style-type: none"> Any solid waste (including soil that is being disposed) is considered a hazardous substance and prohibited from disposal in RCRA Subtitle D (non- hazardous) landfills if its leachate contains 0.2 mg/ L mercury or greater (40 CFR 261.24); land disposal in RCRA Subtitle C (hazardous) landfills is allowed only after prescribed treatment to reduce mercury in extract to 0.2 mg/ L (40 CFR 268). Certain wastes are listed as hazardous due, at least in part, to the presence of mercury (e. g., K071 = brine purification muds from the mercury cell process in chlorine production, and K106 = wastewater treatment sludge from the mercury cell process in chlorine production). The amount of mercury in a number of hazardous wastewaters (e. g., F039, K071, K106, P065, P092) must be treated down to specified levels to meet the land disposal restrictions.

¹ Under the 1990 Clean Air Act Amendments, mercury and mercury compounds are regulated as hazardous air pollutants (HAPs). MACT standards will apply to major stationary sources emitting more than 10 ton/yr of mercury or any other one HAP, or 25 ton/yr of any combination of HAPs.

Appendix E: Federal Mercury Controls

Adapted from OECD, 1995

<i>Specific Sources/focus</i>	<i>Control/action</i>
Any Environmental Release	<ul style="list-style-type: none"> Any release of 1 pound or more of mercury into the environment in a 24- hour period (the reportable quantity) must be reported immediately to the National Response Center if the release is not federally permitted (40 CFR 302). Certain facilities that release more than a reportable quantity of mercury must immediately report the release to state and local entities. Any release or transfer of mercury by facilities that exceed use or manufacturing thresholds is reportable under the Toxic Release Inventory.
Foodstuffs or Feed	<ul style="list-style-type: none"> Action level for methylmercury in fish, shellfish and other aquatic animals = 1 ppm (FDA CPG 7180.07). The import of foods containing the residue of mercury- containing pesticides that are not registered for use in the U. S. is prohibited.
PRODUCTS	
Batteries	<ul style="list-style-type: none"> By early 1991, all U. S. manufacturers converted production so that the mercury content of batteries, except in button and coin cells, did not exceed 0.025% by weight. Federal legislation pending concerning the manufacture of only "non- mercury" formula batteries of all types by 1- 1- 97. Federal ban on mercury button cell batteries pending as of 1- 1- 95. Federal legislation permitting only the manufacture of "no mercury" formula zinc carbon batteries pending as of 1- 1- 95.
Paints and Pigments	<ul style="list-style-type: none"> All uses of mercury in paints have been discontinued.
Dental Uses	<ul style="list-style-type: none"> Dental mercury is classified as a Class I medical device, with extensive safety regulations on its use. Dental amalgam alloy is classified as a Class II device, subject to additional special controls. U. S. Public Health Service has recently studied risks from mercury amalgams and recommended tighter controls on dental uses of mercury and further research to reach more definitive conclusions on risk.
Lighting	<ul style="list-style-type: none"> Because many fluorescent lamps are classified as RCRA hazardous wastes under current test procedures, U. S. EPA is evaluating options for lamp disposal. Major options are 1) conditional exclusion of lamps from hazardous waste management requirements, and 2) handling lamps in a special collection system for other "low grade" and small quantity hazardous wastes (such as batteries and household pesticides).
Pesticides	<ul style="list-style-type: none"> No current production of mercury- containing pesticides; all former registrations have been cancelled or requests for voluntary cancellation have been received.
Special Paper Coatings	<ul style="list-style-type: none"> The only two companies that manufacture these products have announced that plans are being developed to phase out the use of mercury in the coatings. It is predicted that mercury will be eliminated entirely from this application by 1995.
Pharmaceuticals	<ul style="list-style-type: none"> Removal or restriction of mercury in "over- the- counter" (OTC) drugs such as anorectal products and topical antiseptics. Request for additional data on other OTC mercury antimicrobials.
Cosmetics	<ul style="list-style-type: none"> The use of mercury as a preservative or antimicrobial is limited to eye- area cosmetics or ointments in concentrations less than 60ppm (21 CFR 700.13).
OTHER STANDARDS AND PROGRAMS	
Occupational Standards	<ul style="list-style-type: none"> OSHA Standards: ceiling limit of 0.1 mg/m³ for inorganic and elemental mercury, 0.01 mg/m³ as an 8- hr time weighted average for alkylmercury compounds, and a ceiling limit of 0.04 mg/m³ for alkylmercury compounds². All forms of mercury are assigned a skin notation, indicating that the substance is absorbed through the skin and therefore skin contact should be avoided. As an OSHA hazardous chemical, the presence of mercury at a facility requires submittal of a Material Safety Data Sheet.

²

More stringent standards were recently overturned in U.S. court.